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CLAIMS

1. A honeycomb structure, comprising:

a cell structure section including a plurality of cells partitioned by a plurality of

5 partition walls; and

an outer circumferential wall section surrounding the cell structure section;

wherein the cell structure section includes a first partition wall group having the
partition walls positioned in parallel, and a second partition wall group having the
partition walls which intersect the partition walls of the first partition wall group at right
10 angles and are positioned in parallel, each of the partition walls connecting two different
locations of the outer circumferential wall section through one continuous plane;

wherein partition wall intervals of each of the partition wall groups positioned in
parallel are varied stepwise in at least a part of the cell structure section, and at least some
of the cells have a rectangular cross-sectional shape; and

15 wherein all the partition walls have such a ratio of a cell side length to a partition
wall thickness that the partition wall can withstand pressure during canning.

2. The honeycomb structure according to claim 1, wherein a square of the ratio of
the cell side length to the partition wall thickness ((cell side length/partition wall
20 thickness)²) of the partition walls of the cell structure section is 1,000 or less.

3. The honeycomb structure according to claim 1 or 2, wherein a flattening ratio
(long side length/short side length) of the cells in the cell structure section is 2.0 or less.

25 4. The honeycomb structure according to any of claims 1 to 3, wherein the
partition wall intervals of the first partition wall group are varied at a different pattern or
size relative to the partition wall intervals of the second partition wall group.

5. The honeycomb structure according to any of claims 1 to 4, wherein the

partition wall intervals are varied geometrically in a region in which the partition wall intervals are varied stepwise.

5 6. The honeycomb structure according to any of claims 1 to 5, wherein the partition wall intervals are varied arithmetically in a region in which the partition wall intervals are varied stepwise.

10 7. The honeycomb structure according to any of claims 1 to 6, wherein a partition wall interval variation ratio ($|\text{next partition wall interval} - \text{reference partition wall interval}| / \text{reference partition wall interval}$) is 0.5 or less in a region in which the partition wall intervals are varied stepwise.

15 8. The honeycomb structure according to any of claims 1 to 7, wherein the cells are alternately plugged on either end face.

9. The honeycomb structure according to any of claims 1 to 8, wherein a catalyst component is loaded on a surface and/or inside of the partition wall.

20 10. The honeycomb structure according to any of claims 1 to 8, wherein an adsorbent component is loaded on a surface and/or inside of the partition wall.

25 11. The honeycomb structure according to any of claims 1 to 8, wherein a catalyst component and an adsorbent component are loaded on a surface and/or inside of the partition wall.

12. An exhaust gas purification converter, comprising the honeycomb structure according to any of claims 1 to 11.

13. A die for forming a honeycomb structure, the die comprising:

lattice-shaped slits which are open on one face of a die substrate; and
a plurality of holes which are open on an opposite face of the die substrate, each
of the holes introducing a raw material into a specific region of the lattice-shaped slits;
wherein open slit areas per unit lattice are varied stepwise in at least some of the
5 lattice-shaped slits;

the die including a structure which varies flow rates of the raw material
introduced into regions having different open slit areas per unit lattice at a ratio
substantially equal to a variation ratio of the open slit areas.

10 14. The die for forming a honeycomb structure according to claim 13, wherein the
structure which varies the flow rates of the raw material introduced into the regions is a
structure in which at least one of intervals of the holes, inner diameters of the holes, and
raw material path lengths of the holes is varied.

15 15. A die for forming a honeycomb structure, the die comprising:
lattice-shaped slits which are open on one face of a die substrate; and
a plurality of holes which are open on an opposite face of the die substrate, the
holes communicating with intersections of the lattice-shaped slits;
wherein open slit areas around the intersections of the lattice-shaped slits are
20 varied stepwise in at least some of the lattice-shaped slits;
the die including a structure which, at a ratio substantially equal to a variation
ratio of the open slit area around a next intersection adjacent to one intersection of the
lattice-shaped slits to the open slit area around the one intersection (next intersection/one
intersection), varies a flow rate of the raw material introduced into the next intersection
25 from a flow rate of the raw material introduced into the one intersection.

16. The die for forming a honeycomb structure according to claim 15, wherein the
structure which varies the flow rate of the raw material introduced into the next
intersection is a structure in which at least one of intervals of the holes, inner diameters of

the holes, and raw material path lengths of the holes is varied.

17. The die for forming a honeycomb structure according to claim 15, wherein the structure which varies the flow rate of the raw material introduced into the next
- 5 intersection is a structure in which intervals of the holes, inner diameters of the holes, and raw material path lengths of the holes are varied.